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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/806,465	06/28/2001	Eberhard Holder	225/48715	1440

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EXAMINER

BARRY, CHESTER T

ART UNIT	PAPER NUMBER
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1724

DATE MAILED: 09/23/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/806,465

Applicant(s)

HOLDER ET AL.

Examiner

Chester T. Barry

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1 ☐ Certified copies of the priority document have been received.
- 2 ☐ Certified copies of the priority documents have been received in Application No. _____.
- 3 ☐ Or, after a preliminary examination, the applicant has been notified that the priority documents have been received.

- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of Preliminary Action (PTO 102)
- 2) ☐ Notice of Disposition of Patent Drawing (view) (PTO 103)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Other: _____
- 5) ☐ Notice of Disposition of Patent Drawing (view) (PTO 103)
- 6) ☐ Other: _____

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Claims 13 - 17, 18 - 29 are rejected under 35 U.S.C. Sec. 103(a) as obvious over Nemeth '536 in view of any one of Ref. A - G.

USP 5360536 to Nemeth describes stationary refinery desulfurization of motor fuels or motor fuel feedstocks using the claimed process, but does not describe Ag (silver) among the list of suitable dopants (col 6 lines 37-38). Any one of the following references A - G, however, suggest substitution of silver (Ag) for the metals described at Nemeth col 6.

A. U.S. Pat. No. 5146039 discloses the use a zeolite containing copper, silver, zinc or mixtures thereof for low level recovery of sulfides and polysulfides from hydrocarbons. Both of these adsorbents employ chemisorption.

B. USP 6271173 to Khare is cited of interest for a Process for producing a desulfurization sorbent, but the reference is not prior art.

C. U.S. Pat. No. 5057473 discloses a desulfurization adsorbent, which comprises mono-(copper) or bication (copper-lanthanum) exchanged forms of a molecular sieve X.

D. U.S. Pat. No. 5146036 describes the use a zeolite containing copper, silver, zinc, or mixtures thereof for the low-level recovery of sulfides or polysulfides.

E. USP 5146039 for a Process for low level desulfurization of hydrocarbons issued to Wildt describes a complete zeolite containing

silicon, or zinc, or combinations thereof useful for the desulfurization of naphtha feed streams.

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G. USP 3971712 is directed to a process for removing sulfur impurities from a fluid by contact with silver articles. For sulfur removal from flue gas, the process apparatus and conditions can be similar to those in the "Shell Flue Gas Desulfurization" or "SFGD" process, which uses a bed of CuO on alumina as an acceptor for SO₂; however, in my process the acceptor material is the porous silver article described herein (which can be used in the form of parallel pipes, such as about one by two by four inches or can be in the form of baffles of any convenient configuration)..

Furthermore, it would have been obvious to have placed the fuel purifier of Nemeth on-board a working ship or other motorized vehicle to render the same mobile, as suggested by either or both DE 373 321 to Greul or USP 3616375 to Inoue.

The remaining limitations of claims 14 – 17, 19 – 29 not specifically addressed above are either shown and suggested by the references cited, or would have been otherwise obvious as well known and conventional expedients, such as the provision of a fuel filter in a fuel-combusting motor.

Claim 18 is rejected under 35 U.S.C. Sec. 112, 2nd parag., for failing to particularly point out and distinctly claim the subject matter for which patent protection is sought. It is unclear how the adsorption material comprising Al, Ti, Mg, Si, and the like set forth in claim 13, could be a biogenic material e.g., an enzyme or microorganism. Page 2 lines 11 – 12 do not support the view that biogenic materials are inorganic.

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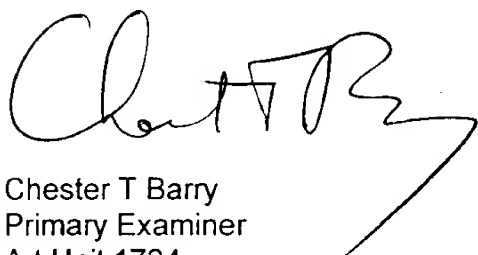
Claim 18 is rejected under 35 USC § 112(1) for failing to particularly point out and distinctly claim the subject matter for which patent protection is sought. To provide an enabling disclosure for enzyme or microorganism adsorbents based on Al, Si, Mg, Ti, zeolite or the like as set forth in claim 13.

USP 6235519 to Wang discloses bacteria capable of desulfurizing fossil fuels, so use thereof to desulfurize fuel aboard a mobile body, such as a motor vehicle, would have been obvious. A biogenic adsorbent selected from the group of enzymes and microorganisms comprising Al, Ti, Si, or Mg or the like, does not appear to be known or suggested.

USP 6130081 to Konishi is cited for its disclosure of prior work in the field of microbial

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desulfurization of fossil fuels.¹

Chester T Barry
Primary Examiner
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¹ There are a large number of reports on methods of removing sulfur from petroleum by use of microorganisms. Joachim et al. have observed degrees of desulfurization of 60 to 80% in 2 days by continuous treatment of a highly viscous heavy oil fraction with *Pseudomonas* HECC39 at 30.degree. C. (Bauch, J., Herbert, G., Hieke, W., Eckart, V., Koehler, M., Babenzin, H. D., Chemical Abstracts 82530y vol. 83 (1975)). Yuda has reported that petroleum is converted into a water-soluble compound by allowing petroleum to be in contact with *Pseudomonas haconensis* (Yuda, S., Unexamined Published Japanese Patent Application No. 75,107,002; Chemical Abstracts 46982j vol. 84 (1976)). In addition, Lee et al. have reported desulfurization of crude oil, heavy light gas oil, kerosine and naphtha by a sulfur-oxidizing strain *Thiobacillus thiooxidans* and a sulfur-reducing strain *Pseudomonas* sp. (Lee, M. J., Hah, Y. C., Lee, K. W. Chemical Abstracts, 145448s, vol. 85 (1976)). They have examined the desulfurization abilities of various sulfur-oxidizing microorganisms and sulfur-reducing microorganisms, and have reported that *Thiobacillus thiooxidans* has the highest ability to oxidize sulfur and *Pseudomonas putrefaciens* and *Desulfovibrio desulfuricans* have the highest ability to reduce sulfur (Lee, M. J., Hah, Y. C., Lee, K. W. Chemical Abstracts, 156414d, vol. 85 (1976)). Isolation of 7 sulfur-reducing *Pseudomonas* strains has also been reported by the same group. Further, Eckart et al. have reported oxidative desulfurization of Romashkino crude oil and fuel oil by *Pseudomonas desmolyticum* (Eckart, V., Hieke, W., Bauch, J., Gentzsch, H. Chemical Abstracts, 142230q, vol. 94 (1981); Eckart, V., Hieke, W., Bauch, J., Gentzsch, H. Chem. Ber. 114, 1077 (1981); Eckart, V., Hieke, W., Bauch, J., Gentzsch, H. Chem. Ber. 114, 1077 (1981)). A microorganism whose desulfurization reaction mechanism was revealed makes use of the cleavage reaction to C--C bonds in a sulfur compound molecule contained in oil.

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